

**From:** Michael Skougard [mailto:michael.skougard@gmail.com]  
**Sent:** Thursday, January 21, 2010 12:36 PM  
**To:** Andrea Wilkes; Stacey Schueler  
**Cc:** Brian Whipple; Mike West; Enyeart, Sandra B.  
**Subject:** Fwd: info

Andrea and Stacey,

I think this will answer all, or at least most, of your questions regarding NTS water systems. Ignore the square mileage number in the very first paragraph--it's the old number (I guess these guys haven't been informed that the NTS got bigger about 9 years ago!).

Please let me know if there are any additional questions or you need further information.

Mike Skougard

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From: **Rudolph, David** <[RudolpDD@nv.doe.gov](mailto:RudolpDD@nv.doe.gov)>  
Date: Thu, Jan 21, 2010 at 9:04 AM  
Subject: info  
To: [michael.skougard@gmail.com](mailto:michael.skougard@gmail.com)  
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Mike,

I compiled some information regarding the NTS Water systems. Most of it was taken from the O and M Manual. Please feel free to pick and choose what parts of this document you would like to use. This info is accurate, as we just revised the manual last month, if you need anything else or are looking for something different please let me know.

David D. Rudolph  
Senior Scientist  
Water and Waste Section  
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## **Description of the Nevada Test Site and Public Water Systems**

### **Nevada Test Site (NTS)**

The NTS encompasses 3500 km<sup>2</sup> (1350 mi<sup>2</sup>) of unpopulated desert land in southern Nevada, surrounded on three sides by the Nellis Air Force Range and on the south by public lands managed by the Bureau of Land Management. The topography is typical of the Basin and Range physiographic province, with long, linear mountain ranges, trending roughly north-south and separated by relatively flat alluvial basins. Elevations range from 900m (3000 feet) to 2300 m (7694 feet) above sea level.

There are no continuously flowing streams on the NTS, and most stream beds only carry water during or immediately after rainfall. The only permanent surface water sources are a few small, perennial springs, and manmade sumps for storing construction water. The lake beds in the alluvial valleys contain water for a few hours to weeks after storms. These valleys are closed basins with no outlet except evaporation and percolation.

The drinking water needs of the NTS are met by groundwater drawn from deep wells from two major aquifers that are not influenced by surface waters: the volcanic, and the alluvial aquifers. In addition groundwater is also withdrawn for non-potable, construction, and fire protection purposes from the carbonate, volcanic and alluvial aquifers.

### **NTS Public Water Systems**

Potable water is provided to the NTS via three discrete permitted public water systems (PWSs) served by six wells (Appendix A). The transmission and distribution systems include mains, valves, hydrants, booster pump stations, pump suction tanks, and reservoir storage tanks. The PWS extends to the point of the service connection. Two tanker trucks used to haul potable water from the permitted wells to remote work sites are also permitted but are not considered PWSs.

The NTS may host commercial ventures that may be required to maintain separate PWSs for which the NTS will supply the source water. These facilities will apply for their own permits and will be responsible for monitoring.

### **PWS NV0000360 (Serving NTS Areas 5, 6, 22, and 23)**

This non-transient, non-community system operates under permit NY-0360-12NTNC. This system serves the majority of NTS workers, including those in the Mercury base camp, Gate 100, Desert Rock Airstrip, Area 5, Area 6, the U1a camp, and the private water systems relying on hauled water.

Appendix A lists the source wells and the major components of this PWS. Three wells, 5b, 4, and 4a provide water to the potable water system. Water is pumped to the Mercury water storage tanks from the Area 5 Booster Station. The service connections in Area 6 and U1a receive water by gravity flow from the CP tanks. The RNCTEC facility in Area 6 receives gravity flow from

Well 4a, and uses a booster pump system to achieve necessary pressure. Area 5 receives gravity flow from the 4a tanks. Mercury, Gate 100, and Desert Rock Airstrip receive gravity flow from the Mercury tanks.

#### **PWS NV0004098 (Serving Area 25)**

This transient system operates under permit NY-4098-12NC. This system serves workers in the Area 25 Central Support Area, the RCP, and also constitutes the source water for DOE's Office of Repository Development (formerly Yucca Mountain Project) PWS, which operates independently of the NTS system under permit NY-0867-12NCNT, which is currently inactive.

Two wells, J-12 and J-13 supply this system. Appendix A lists the source wells and the major components of this PWS. Water is pumped from both wells to the J-11 storage tank and from there to the Fire Station storage tank compound. When the RCP compound is occupied, water is pumped from the J-11 tank to the RCP storage tank, then into the service lines within that compound.

#### **PWS NV0004099 (Serving Area 12)**

This non-transient, non-community system operates under permit NY-4099-12NC. This system serves workers in the Area 12 base camp. Water is pumped from Well 8 to the Hilltop storage tank, then to the 2 storage tanks above the Area 12 camp, from which it gravity flows to the distribution system. The transmission main that previously served Area 2 is no longer in service.

#### **Responsibilities**

The U.S. Government holds the water rights on the Nevada Test Site (NTS). The U.S. Department of Energy National Nuclear Security Administration Nevada Operations Office (NNSA/NSO) is the administrator of those water rights and holds the ultimate responsibility for the drinking water on the NTS. NNSA/NSO holds the permits for the three PWSs and the two water-hauling tankers. The Assistant Manager for Safety and Operations/Infrastructure Management Group oversees the physical aspects of the PWSs, and proposes new projects associated with the PWSs at the NTS. The Assistant Manager for Environmental Management/Environmental Protection Team is responsible for compliance with the permit and the regulations. NNSA/NSO directs its prime contractor, National Security Technologies, LLC (NSTec) to maintain the systems and provide water to designated NTS users. NSTec's Environmental Services Department (ESD) serves as the single point of contact within the NNSA/NSO for Safe Drinking Water Act (SDWA) compliance issues with the state of Nevada. The ESD submits permit applications, maintains permits, and transmits monitoring reports and other reports to the BSDW. NSTec Operations and Infrastructure Water and Waste Section operates the NTS water systems in accordance with contractual requirements and company performance documents to supply water to workers and visitors, as well as construction and

industrial facilities. The Water superintendent of the Water and Waste Department is the certified operator for the NTS public water systems and also serves as the Person in Responsible Charge.

## **Operational and Maintenance Activities**

### **Maintenance and Repairs of Mains, Tanks, Pumps, and Equipment**

NSTec's Water and Waste Section establishes a maintenance schedule that ensures that all equipment up to the point of the service connection receives necessary attention by certified operators to provide an adequate supply of good quality drinking water to NTS workers, and to allow for enough pressure for fire protection demand. The Water and Waste Section assigns daily, weekly, monthly, and annual tasks; including checking water levels in storage tanks; checking recording charts; maintaining chlorinators; monitoring and recording residual chlorine levels; servicing pump motors and valves; driving along water lines to check for leaks; reading flow meters to estimate water usage; maintaining the electrical and mechanical systems of pump houses and valve stations; and inspecting storage tanks for coating integrity. Work Orders for all routine tasks assure work proceeds in compliance with the PWS permits, state and federal regulations, and procedures. The preventive maintenance tasks listed above and routine equipment repair and replacement do not require prior approval by the BSDW if they meet the criteria in Table 1, Part 1. Non-routine work such as a repair receives a review prior to proceeding to make sure it falls within the Table 1 Part 1 guidelines.

Water mains at the NTS were installed over a period of 50 years and are composed of a variety of material, including cast iron, steel, ductile iron, PVC, asbestos cement, and fiberglass pressure pipe. Service lines are PVC, copper, galvanized steel, and black steel. Many of the water mains, especially in Area 25, are in poor condition and subject to leakage. Some older water mains and water tanks have been replaced or refurbished recently, thus extending the life of the aging water systems, but there is no regular schedule to replace mains.

After repairs that result in a loss of pressure in the line, the results of an analysis of the water indicating that it meets primary standards for coliform bacteria are reported to NDEP. The water main is put back in to service upon approval by NDEP. If a water main is kept full of water under continuous pressure while it is being repaired monitoring and approvals are not required.

Maintenance and restoration of potable water storage tanks are conducted in accordance with the requirements outlined in NAC 445A.67085 2(a)-(c) (tank curing) and (3) (disinfection). These requirements will need to be met prior to placing any water tank back into service either due to maintenance or restoration activities.

### **Disinfection**

To ensure health protection of NTS workers, NSTec Water and Waste Section disinfects NTS drinking water to prevent bacteriological contamination. Tablet chlorinators at six of the booster stations (Area 5, Well 4/4a, Well J-12, Well J-13, Well 8 Booster, and C-1 Booster) keep the concentration of free residual chlorine in the transmission and distribution systems between 0.05 and 3.0 mg/l.

Chlorine levels are measured daily during regular work days by Water and Waste personnel. Samples are collected downstream from the chlorinators. The records are kept at the booster pump houses. Chlorine residual at the tap is measured monthly, in the NV0000360 system and quarterly in the other two systems in conjunction with microbiological monitoring.

Water hauled in the permitted water hauling trucks to a permitted PWS must have a chlorine residual of at least 1 mg/l (NAC 445A.67285), so chlorine in the form of sodium hypochlorite is added to loads destined for a PWS. Water hauled to private water systems on the NTS receives additional disinfection if warranted. NSTec measures chlorine residual monthly from the two permitted trucks in conjunction with microbiological monitoring.

New water mains and parts of the systems that are compromised because of new construction, modification, or repairs require disinfection before they can be placed into operation. Parts of the system that have been out of service are also disinfected before being placed back into service. Disinfection proceeds in accordance with American Water Works Association Standard C651-05 (water lines), C652-02 (tanks), or C654-03 (wells). An analysis of the water main which indicates that it meets primary standards for coliform bacteria must be obtained and reported to the health authority. The NSTec Water and Waste Section completes a Disinfection Log and retains the log retained in their files. Compliance with the above directive is not required if a water main is kept full of water under continuous pressure while it is being repaired.

## APPENDIX A

### NV0000360 (NTS Areas 23 and 6) (Permit No. NY-0360-12NTNC)

Type of PWS: Non-Transient, Non-Community Water System (Distribution-2 system)  
Service Area: Mercury, Area 5, DAF, CP, Yucca Lake facilities, Area 6 Construction Camp, U1a, Gate 100, and Desert Rock (approximately 2000 customers)

#### Source Wells:

Well Name	Area	Well Number	Total Depth (ft)	Pump Depth (ft)	Aquifer
Well 5b	5	PS0360-W02	900	814	Valley-Fill alluvium
Well 4	6	PS0360-W04	1479	1350	Volcanic
Well 4a	6	PS0360-W05	1516	969	Volcanic

#### Storage Tanks: (ST)

Tank Location/SDWIS ID #	Capacity (gal.)	Type	Status	Associated Wells
Mercury Camp south tank	1,500,000	storage	in use	PS0360-W02,

(ST10)				(W04,W05)
<sup>1</sup> Mercury Camp north tank (ST09)	1,500,000	storage	in use	
Mercury Camp	250,000	storage	closed	
Area 5 booster station (ST05)	50,000	pump suction	in use	PS0360-W02, (W04, W05)
CP north tank (ST07)	317,000	storage	in use	PS0360-W04, W05
CP south tank (ST06)	500,000	storage	in use	
<sup>1</sup> Well 4/4a south tank (ST01)	150,000	pump suction	in use	PS0360-W04, W05
Well 4/4a north tank (ST04)	150,000	pump suction	in use	
<sup>1</sup> Well C-1 south tank (ST11)	60,000	pump suction	in use	PS0360-W04, W05
Well C-1 north tank (SAT03)	60,000	pump suction	in use	
Area 5 north tank (ST13)	250,000	storage	in use	
Area 5 south tank	250,000	storage	In use	

Booster pump stations:

Well 5b, 4 pumps

Well 4/4a, 2 pumps

<sup>1</sup> Entry point into the distribution system for monitoring purposes

**NV0004098 (NTS Area 25)**  
(Permit No. NY-4098-12NTNC)

Type of PWS: Transient, Non-Community Water System (Distribution-1 system)

Service Area: Area 25 compounds, and also provides source water to the Yucca

Mountain portal water system (approximately 20 service connections)

Entry Point: J-11 Booster Pump House

Source Wells:

Well Name	Area	Well Number	Total Depth (ft)	Pump Depth (ft)	Aquifer
Well J-12	25	PS4098-W01	1139	834	Volcanic

Well J-13	25	PS4098-W02	3488	1240	Volcanic
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Storage Tanks:

Tank Location/SDWIS ID #	Capacity (gal.)	Type	Status	Associated Wells
Area 25 Base camp fire station (ST09)	100,000	storage	in use	PS4098-W01, W02
ETS (serves EMAD and J-11) (ST07)	150,000	storage	in use	PS4098-W01, W02
Test Cell C (ST02)	150,000	storage	closed	PS4098-W01, W02
Test Cell A (ST03)	50,000	storage	closed	PS4098-W01, W02
RCP (Mabel's Place) (ST01)	100,000	storage	in use	PS4098-W01, W02
<sup>1</sup> Well J-11 (serves base camp and RCP) (ST08)	150,000	pump suction	in use	PS4098-W01, W02
Well J-12 (ST05)	50,000	pump suction	in use	PS4098-W01, W02
Well J-13 (ST06)	50,000	pump suction	in use <sup>2</sup>	PS4098-W01, W02

Booster pump stations:

Well J-11, 3 pumps

Well J-12, 2 pumps

Well J-13, 4 pumps

<sup>1</sup> Entry point into the distribution system

<sup>2</sup> Well has been offline since April 2006

**NV0004099 (NTS Area 12)**  
(Permit No. NY-4099-12NTNC)

Type of PWS: Transient, Non-Community Water System (Distribution-1 system)

Service Area: Areas 2 and 12 (approximately 54 service connections – fewer than ten active)

Entry Point: Area 12 Tank

Source Wells:

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Well Name	Area	Well Number	Total Depth (ft)	Pump Depth (ft)	Aquifer
Well 8	18	PS4099-W01	5499	1236	Volcanic

Storage Tanks:

Tank Location/SDWIS ID #	Capacity (gal.)	Type	Status	Associated Wells
Area 12 Camp south tank <sup>1</sup> (ST11)	500,000	storage	in use	PS4099-W01
Area 12 Camp north tank (ST10)	317,000	storage	in use	
Area 12 Camp (ST12)	100,000	storage	closed	
Area 12 Camp (ST13)	50,000	storage	closed	
Area 17, between pump house and Well 8 (hilltop) (ST15)	60,000	pump suction	in use	PS4099-W01

Booster pump stations:

Well 8, 1 pump

Area 17 pump house, 2 pumps

<sup>1</sup> Entry point into the distribution system